Anti-CD20 B9E9 scFv-Streptavidin Fusion Protein

National Cancer Institute

Source

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An Escherichia coli periplasm-expressed tetrameric fusion protein composed of four single-chain variable regions (scFv) of the murine immunoglobulin (Ig) G2a anti-CD20 monoclonal antibody B9E9 fused to the streptavidin (SA) gene of Streptomyces avidinii (scFv-SA), with potential use in pretargeted radioimmunotherapy (PRIT). Upon intravenous administration of the anti-CD20 B9E9 scFv-SA fusion protein, this agent targets and binds to CD20-expressing tumor cells. Subsequently, a biotinylated N-acetylgalactosamine-containing clearing agent is administered, which binds to the streptavidin moiety of the unbound fusion protein and promotes its hepatic excretion. In turn, radiolabeled DOTA (1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid)-biotin is administered and, due to its small size, quickly distributes. The biotin moiety efficiently binds to the SA moiety of the bound fusion protein, which localizes the biotin-conjugated radionuclide to the tumor site. CD20, a tumor-associated antigen (TAA), is overexpressed on B-cell malignancies. PRIT increases both tumor uptake and renal elimination of the radionuclide conjugate as compared to conventional radioimmunotherapy (RIT), where the radioisotope is bound to the antibody before administration; this increases the dose of radionuclide delivered to the tumor while limiting radiation exposure for normal, healthy tissues.